

on which my sketch was made the spot of which I am speaking not only cast a shadow (assuming these markings to be such), but shadows, as two (as shown in my drawing) were visible, one on



Jupiter, 1879, Oct. 4. 10^h 40^m A.M.T.

4.2-inch Ross Achromatic ; 61 inches focus ; power, 255.

its preceding and the other on its following edge. I confess that no immediate explanation of this occurs to me. In the relative position occupied by *Jupiter* and the Sun at the epoch of my drawing, if we assume the white spot to have consisted of a globular mass of vapour raised high above the surrounding surface of the planet, it is quite evident that it would cast a well-marked shadow behind it. Upon what principle, however, it should simultaneously throw another one in front of it I am wholly at a loss to determine. It may be worthy of remark that the light interval separating the northern and southern equatorial belts, which at the epochs of my sketches merely appeared as a sinuous but unbroken line on that part of *Jupiter's* disk more immediately north of the red spot, on the opposite side of the planet presented a much more complicated form. It altered in this respect between September and October.

Forest Lodge, Maresfield,
Uckfield, Sussex,
1879, November 12.

Note on the Spectrum of the Red Spot on Jupiter.

By Lord Lindsay.

Spectrum of *Jupiter* in Grubb spectroscope on 15-inch. Lowest power best. Probably 100 solar lines seen. The 3 magnesium lines beautifully separated. Slit at right angles to belts. The red equatorial belt seen as a dark band running through the

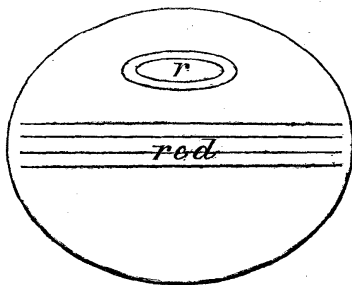
spectrum from extreme red end to between F and G, limit about $38^{\circ}31' = 453^{\text{mm}}$ wave-length, much the darkest from about *b* to F, somewhat darkest of all nearer F.*

Examined satellites 1, 2, and 3; could not make out any lines. The spectrum of 3, when much broadened by a cylindrical lens, was repeatedly seen to be traversed from end to end by a dark band, as if it had belts.

Jupiter.—Slit parallel to belts. Only one very small spot showed the obscuration described above. On examining *Jupiter* with the low power on the micrometer, it was found that the obscuration in this case arose from a detached red spot in the southern hemisphere. The absorption seemed to be more restricted to the region of spectrum near *b* and F than in previous observation.

With the prism of the Vogel spectroscope held in front of eye-piece of the micrometer, obscuration-lines were very distinctly seen when refraction angle of prism was parallel to axis of *Jupiter*. In other positions they were overwhelmed by the light from the remainder of the disk.

The general appearance of *Jupiter* was very roughly somewhat like this at 13^h:



The upper red spot was surrounded by a very narrow white margin.

Observers, R. Copeland and J. G. Lohse.

A few weeks ago the Rev. James Virtue, of Dumfries, was so kind as to point out that he saw the large detached red spot on *Jupiter* with the Dun Echt Refractor on the night of June 26, 1878. The date is confirmed by the Diary at Dun Echt, although the observation is not recorded.

The visitor describes the "cloud" as seen "on the upper right quarter of the disk."

1879, Sept. 26.

* This phenomenon is fully described by Vogel in his *Untersuchungen über die Spectra der Planeten*, pp. 25, *et seq.*